

# INDIANA'S MOTORBOAT FUEL TAX

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BY

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AND

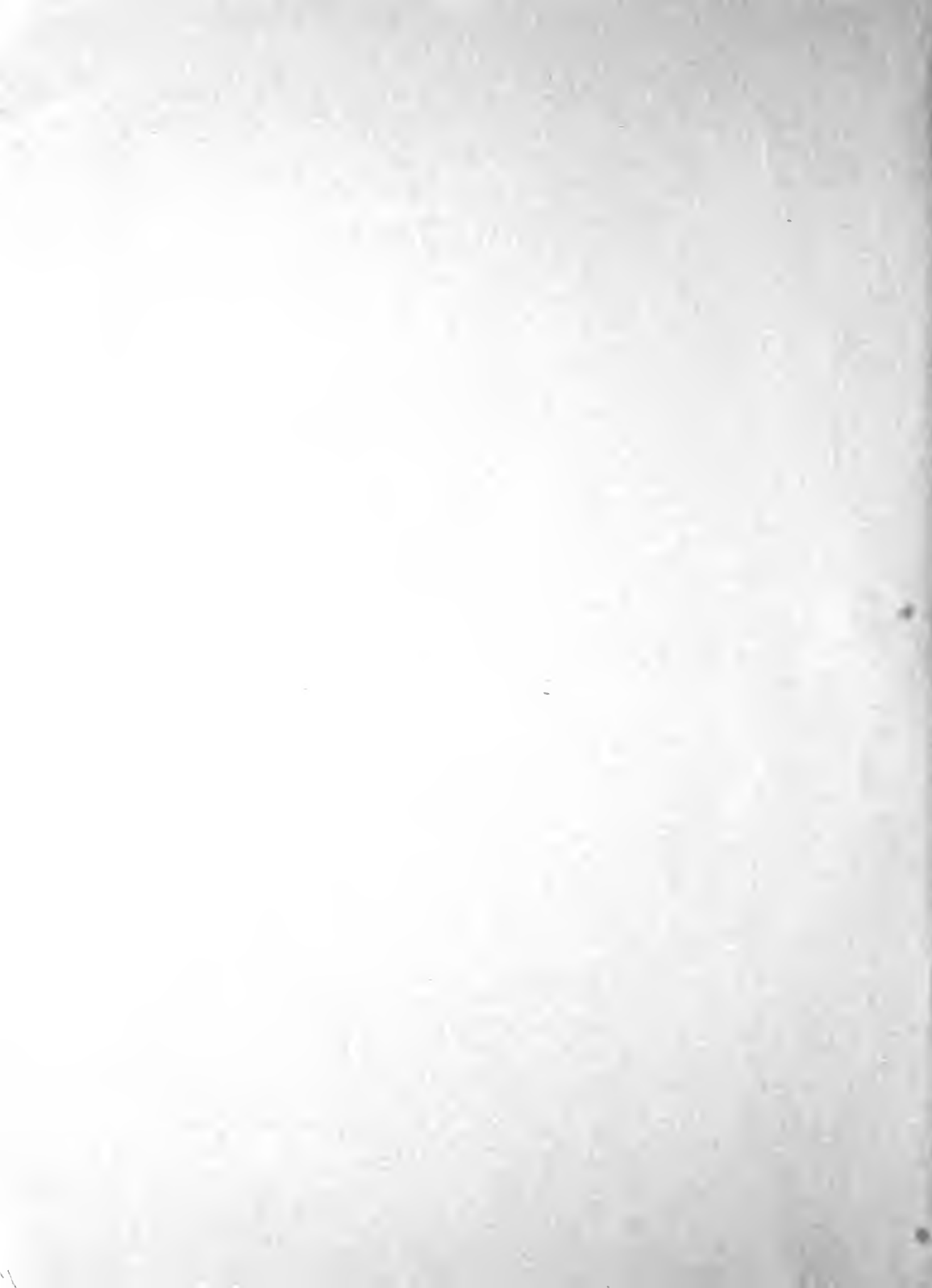
W.L. GRECCO

# JHRP

JOINT HIGHWAY RESEARCH PROJECT

PURDUE UNIVERSITY AND

INDIANA STATE HIGHWAY COMMISSION



Progress Report

INDIANA'S MOTORBOAT FUEL TAX

TO: J. F. McLaughlin, Director  
Joint Highway Research Project

March 25, 1970

File No. 3-3-37

FROM: H. L. Michael, Associate Director  
Joint Highway Research Project

Project No. C-36-54KK

The attached brief Progress Report "Indiana's Motorboat Fuel Tax" by D. C. Robinson and W. L. Green is on the FFR research project "Recreational Impact of Federal Multi-Purpose Reservoirs". The special study was made in an effort to estimate the annual quantity of gasoline used by motorboats in Indiana.

The report is presented to the Board for information and for acceptance as partial fulfillment of the objectives of the referenced research project. The report will also be submitted to the ISMC and the BPR for their review, comment and acceptance.

Respectfully submitted,

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Associate Director

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Progress Report

INDIANA'S MOTORPOOL FUEL TAX

by

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File No. 3-3-3  
Project No. C-36-147K

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Joint Highway Research Project  
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and the

U.S. Department of Transportation  
Federal Highway Administration  
Bureau of Public Roads

The opinions, findings and conclusions expressed in this publication are those of the authors and not necessarily those of the Bureau of Public Roads.

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or the  
Bureau of Public Roads

Lafayette, Indiana  
March 25, 1970



ABSTRACT

The purpose of this research project was to estimate the total amount of gasoline consumed per acre of cropland in the State of Indiana for which there was a 1940 census.

Motorboat fuel consumption data for 1940 was obtained from questionnaires mailed in January, 1941, to all registered motorboat owners in Indiana. The data was then analyzed by the Indiana Department of Natural Resources.

The results of the study show that the average gasoline consumption per acre of cropland in Indiana for 1940 was 1.14 gallons. This amount represents 1.14 times the amount of gasoline consumed per acre of cropland in 1930. The gasoline consumption per acre of cropland in 1940 was 1.14 times the amount of gasoline consumed per acre of cropland in 1930.

The questionnaires also gave information on the amount and type of fuel used, the type of engine, the horsepower, and the type of motorboat. The data was then analyzed by the Indiana Department of Natural Resources.





## INTRODUCTION

From 1968, a State Tax of 6 cents was levied in Indiana on each gallon of gasoline purchased. The revenue thus obtained is directed, as in most states, to the financing of highway construction, maintenance and related work.

There are, however, other purposes quite unrelated to highway use for which gasoline is purchased. The State of Indiana, as with most states, provides for tax refunds on fuels used for non-highway purposes, such as agricultural machinery, aircraft and motorboats. It has been generally assumed that very few boatowners claim the refund to which they are entitled.

The extent of the fuel consumed by motorboat users in the various states have ranged from high estimates made by motorboat associations to lower estimates by the various governments' highway agencies. The Indiana State Highway Commission proposed this study to provide an estimate of the gasoline consumed by the motorboat owners throughout the state and of the extent to which these users obtain the motor fuel tax refund from the State.

## DATA COLLECTION

The Indiana Department of Natural Resources maintains a registration list of boatowners. From a sample of 2400 boatowners, a random sample of 700 was selected and these were sent a questionnaire attached as Appendix. Forty-five were returned due to insufficient address. Boatowners responded with 284 usable returns or 43 per cent of 655 possible returns.



Postcard reminders were sent to 300 of the original sample to attempt to stimulate further response. It was not possible to direct the reminders to only the non-responders. This resulted in a return of additional questionnaires or approximately ten per cent of the 300 cards sent. Because the second group of returns strung out over a several month period, the analysis was made from the initial returns.

### ANALYSES

#### Motorboat Registration

Records of the Department of Natural Resources indicated a total registration of 155,000 boats owned. The questionnaire response indicated that fourteen per cent were no longer boatowners. Applying this statistic to the population of the Department's records would provide a new estimate of 133,169 boatowners.

In arriving at these estimates, it was assumed that the questionnaires received were representative of the 700 originally mailed out. As a rough check, a figure for the total motorboat registration was estimated from the questionnaires received after reminders were mailed out. The estimate from this small sample was 135,000 boatowners, which lends confidence to the estimate to be used.

Results of the survey indicate that there are 1.33 motors per boat. Based on this inference, the total number of marine motors in the State of Indiana was therefore estimated to be 175,194.

#### Gasoline Consumption

The total gasoline consumption in 1968 by motorboats in Indiana was estimated to be 19 million gallons. This represents eight tenths of one per cent of the total taxable gasoline sales in Indiana in 1968.



which amounted to 2,322 million gallons or a tax of \$139.7 million. (1)\* This estimate results from the survey questionnaire (Appendix) Question 7a which asked for the number of gallons of gasoline consumed in the previous twelve months.

Mean fuel consumptions in 1968 were estimated for each of the nine horsepower categories. These means were calculated from a reduced sample consisting of motorboat owners reporting only one motor. This was necessary because boatowners reporting two or more motors failed to provide separate data for each motor. These estimates are thus based on the assumption that motors from the same horsepower category belong to the same population regardless of whether or not they are owned by a single or multi-motor owner. There is no way of testing the validity of this assumption with the information available in the questionnaires. Table 1 indicates the mean annual gasoline consumed by category. Table 1 and Figure 1 show the percentage distribution of motors by horsepower category. For example, there are approximately 44 per cent of the marine motors ten horsepower or less. The Missouri (2) study estimated 40 per cent for this category. The California (3) study used boat length rather than motor horsepower classification because of variations of fuel consumed per hour by the same rated motor of different ages and conditions.

The mean gasoline consumption in each horsepower rating category is shown in Table 2, column 1. These means were calculated from the answers given to Question 7a on the Questionnaire (total amount of gasoline consumed during a previous 12 month period). The product of the answers to Questions 3 and 4 (days of boat use per typical year and

\*Numbers in Parenthesis refer to items in References.



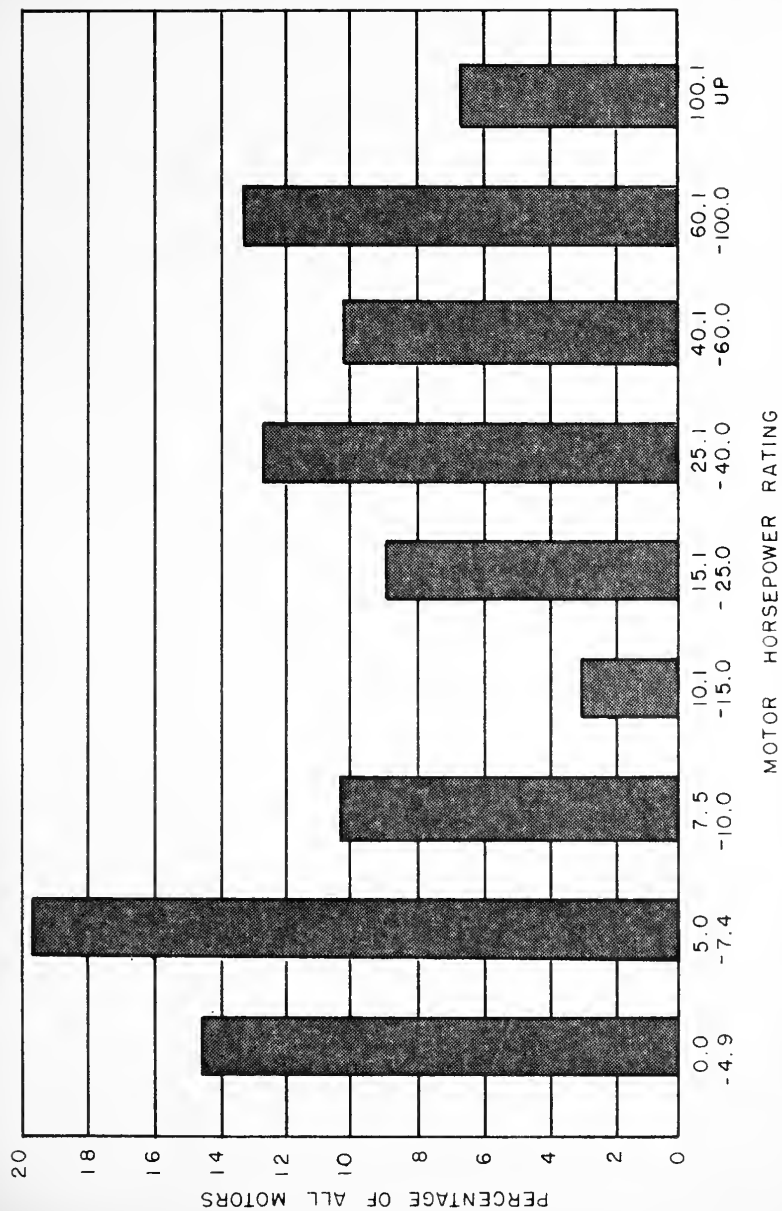
TABLE 1

Annual Fuel Consumption for Various  
Marine Motors by Horsepower Category - 1968

H.P. Rating Category	Sample No.	Percent	Number in Category	Mean Annual Fuel (Gallons)	Total Annual Fuel (Gal.) By Category
0 to 4.9	47	14.64	75479	15.27	221,545
5.0 to 7.4	63	19.63	34391	43.27	1,488,099
7.5 to 10.0	33	10.26	18010	21.55	388,116
10.1 to 15.0	10	3.12	5466	45.00	245,970
15.1 to 25.0	29	9.03	15820	38.77	1,404,341
25.1 to 40.0	61	12.77	22372	111.92	2,503,874
40.1 to 60.0	33	10.23	18010	234.57	4,224,606
60.1 to 100.0	43	13.40	23476	213.59	5,014,239
100.1 and over	22	6.85	17000	256.15	3,072,800
TOTALS	321	100.00			18,734,690







**FIGURE 1**  
**DISTRIBUTION OF MOTORS BY HORSEPOWER**



TABLE 2

Annual Gasoline Consumption for Each  
Horsepower Motor Rating by Survey Method

Horsepower Rating Category	SURVEY METHOD		
	QUESTIONNAIRE		FIELD
	Gasoline Consumed Previous 12 months	Product of Days/Year and Gals/Day	Product of Days/Year and Gals/Day
0.0 to 4.9	15.27	33.70	19.03
5.0 to 7.4	43.27	82.92	29.62
7.5 to 10.0	21.55	35.63	50.93
10.1 to 15.0	45.09	75.50	70.76
15.1 to 25.0	88.77	125.48	70.53
25.1 to 40.0	113.94	174.58	130.56
40.1 to 60.0	234.57	293.01	205.57
60.1 to 100.0	213.59	273.13	280.89
100.1 and over	256.19	352.08	272.39



gallons consumed per typical day) also gives an estimate of the total amount of gasoline consumed within a year. Column 2 of Table 2 shows the mean gasoline consumptions which were calculated from these data.

A two-way analysis of variance test was applied to the two sets of means and there was found to be no significant difference between the two sets with an  $\alpha$  level of 0.05. The purpose of this test was to determine the internal consistency of the responses to Question 7a versus Questions 3 and 4. The analysis indicates that the respondents completed the questionnaire with reasonable care, that the data were probably based upon records or fairly accurate personal estimates. It was decided to use the responses to Question 7a to calculate the total gasoline consumption for 1968 (see Table ), because the question specifically refers to "fuel consumed during a previous 12 months period", not "a typical year" as in Questions 3 and 4.

Mean gasoline consumptions were also calculated from data that were collected from interviews of motorboat owners at Eagles Mill, Mansfield and Monroe Reservoirs during summer 1968. These are tabulated in Table 2, column 3. The same test that was applied to columns 1 and 2 was applied to columns 1 and 3. There was found to be no significant difference between the questionnaire data and the field data. The purpose of this test was to check the validity of the questionnaire responses. The analysis suggests that the sample of motorboat owners that were mailed questionnaires was indeed a representative sample of the total population of motorboat owners in the State of Indiana.

#### Activities of Boatowners

It is estimated that the average motorboat owner makes 28.3 boating trips per year, and that he uses his boat 3.7 hours per trip. These



figures give an average motorboat usage of 105 hours per year.

The way in which motorboat owners spend this time varies from one horsepower rating category to another and is shown in Figure 2 .

It can be seen that the proportion of time spent on fishing decreases with increase in motor horsepower, while the proportion of time spent on cruising and skiing increases with increase in motor horsepower.

#### Out-of-State Motorboat Owners

It was found that almost 7 per cent of all motorboat owners interviewed during 1968 at Cagles Mill, Mansfield, and Monroe Reservoirs lived outside of Indiana. Closer examination of the data, however, revealed that approximately 82 per cent of all the out-of-state motorboat owners interviewed were encountered at Mansfield alone, 3 and 15 per cent being the proportions at Cagles Mill and Monroe respectively.

The high proportion appearing at Mansfield can be explained by this reservoirs close proximity : 26 miles to the Indiana-Illinois Stateline. Cagles Mill and Monroe are 43 and 82 miles respectively from the Stateline. It is very probable that the actual proportion of out-of-state motorboat owners using recreational facilities in Indiana is much less than the 7 per cent recorded at the three reservoirs mentioned above.

It is not known how the amount of gasoline purchased in Indiana by these out-of-state motorboat owners affects the estimate of the total gasoline consumption by motorboats in Indiana. The effect can be considered negligible on the basis that some small portion of the gasoline purchases reported here by Indiana motorboat owners were made while visiting recreational facilities in other states.





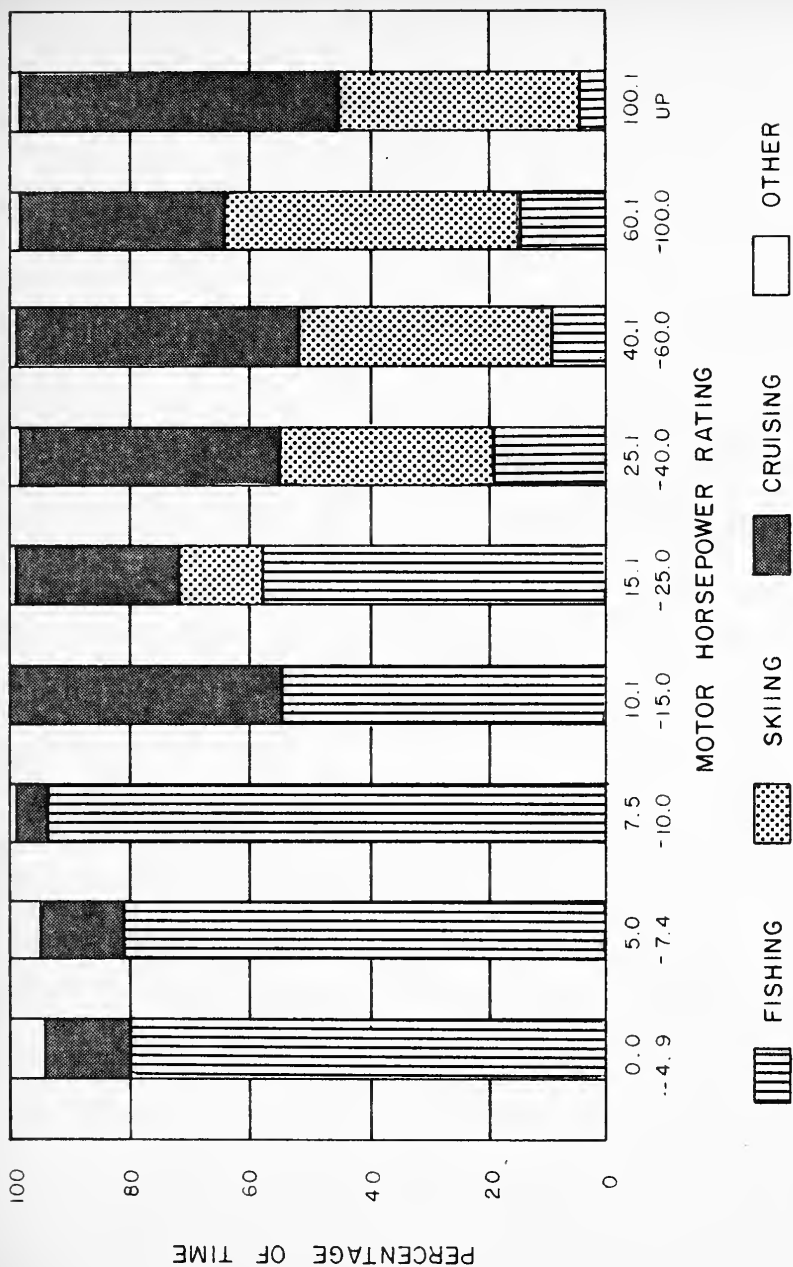


FIGURE 2  
PERCENTAGE OF TIME SPENT ON MAJOR ACTIVITIES BY HORSEPOWER



### State Tax Refunds

It is estimated that the State Tax was refunded on approximately 3 per cent (equivalent to \$37,000) of the total amount of gasoline consumed by motorboats in Indiana. In addition it is estimated that approximately 7 million gallons of gasoline (tax equivalent \$420,000) was sold tax-exempt at State-licensed marinas at recreation areas in Indiana in 1968. (There are approximately 100 marinas currently licensed in Indiana). The combined total from refunds and tax-exempt sales of gasoline is \$457,000. This still leaves a total of \$680,000 that was unrefunded in 1968.

### CONCLUSION

There were 2,322 million gallons of gasoline sold in 1968 in the State of Indiana for all purposes. Of this amount 18.7 million gallons were purchased by the motorboat users. Approximately three per cent of this motorboat consumption was subject to tax refund or approximately 0.6 million gallons. Another 7.0 million gallons were sold tax-exempt at State-licensed marinas at the various recreational areas throughout the state.

Therefore 11.1 million gallons of gasoline were purchased by motorboat users in 1968 for which tax was paid into the motor vehicle tax fund. This amounted to approximately \$680,000 or less one half of one per cent the revenue received from motor vehicle fuel tax.



REFERENCES

1. "Automobile Facts and Figures 1969", Automobile Manufacturers Association, Inc.
2. "Motorboat Fuel Consumption Survey in Missouri", Research Center, School of Business and Public Administration, University of Missouri, Final Report 1967.
3. "Study of Gasoline Tax Refunds for Boats, Aviation and Agriculture, State of California", Wilber Smith and Associates, 1966.



APPENDIX  
QUESTIONNAIRE

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Motorboat Fuel Consumption

The state of Indiana is continually striving to improve existing recreational areas and develop new facilities.

A study is currently being conducted by Purdue University to help in planning for these recreational areas. One phase of this study concerns motorboat fuel consumption. We are asking a carefully-selected sample of boat owners across the state to complete the enclosed questionnaire to help us with this study.

You are asked not to place your name on this questionnaire as there is no reason to identify any respondent.

- A. Our sampling technique includes all boat owners in the state. If you do not own a motor, check here and simply return the questionnaire.

☐

I do not own a motor with my registered boat(s).

- B. If you do own a motor please check the appropriate boxes or respond to the questions asked.

1. Is your motorboat (Check One)

☐

an outboard

☐

an inboard-outboard

☐

an inboard

2. Check the appropriate category for the horsepower rating of your motor(s).

First Motor

Second Motor

\_\_\_\_\_

0.0 - 4.9

\_\_\_\_\_

\_\_\_\_\_

5.0 - 7.4

\_\_\_\_\_

\_\_\_\_\_

7.5 - 10.0

\_\_\_\_\_

\_\_\_\_\_

10.1 - 15.0

\_\_\_\_\_

\_\_\_\_\_

15.1 - 25.0

\_\_\_\_\_

\_\_\_\_\_

25.1 - 40.0

\_\_\_\_\_

\_\_\_\_\_

40.1 - 60.0

\_\_\_\_\_

\_\_\_\_\_

60.1 - 100.0

\_\_\_\_\_

\_\_\_\_\_

100.1 - 150.0

\_\_\_\_\_

\_\_\_\_\_

150.1 - 200.0

\_\_\_\_\_

\_\_\_\_\_

200.1 - up

\_\_\_\_\_

Please Turn Over

3. In a typical year how many days will you use your boat?

\_\_\_\_\_ days per year

4. What is the average amount of fuel your boat will use for a typical day of boating?

\_\_\_\_\_ gallons per day

5. How many hours will your motor be operated during a typical boating day?

\_\_\_\_\_ hours

6. What percentage of your boating time is spent in each of these categories?

\_\_\_\_\_ % skiing

\_\_\_\_\_ % cruising

\_\_\_\_\_ % fishing

\_\_\_\_\_ % other purposes

- 7a. How many gallons of gasoline did you or other people use in this boat during a previous 12 month period?

\_\_\_\_\_ gallons

- 7b. Did you file a claim for a state tax refund on this fuel?

☐

Yes

☐

No

- 7c. Did you file a claim for a federal tax refund on this fuel?

☐

Yes

☐

No

8. How many miles (round trip) did you ordinarily travel between home and the lake or river you usually used the boat in during a previous 12 month period?

\_\_\_\_\_ miles (round trip)

Thank you for your kind assistance.





